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TO: Technical Staff
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DATE: 26 July 2001

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SUBJECT: WATER QUALITY GOALS UPDATE

This is the fifth notice of changes since the publication of the August 2000 edition of *A Compilation of Water Quality Goals*. This notice contains an explanation of the most recent changes as well as instructions for updating your copy of *Water Quality Goals*. The *Water Quality Goals* report and all updates may be obtained on the internet at www.swrcb.ca.gov/rwqcb5/wq_goals.

Public Health Goal for Benzene

In late June, the California Office of Environmental Health Hazard Assessment (OEHHA) released a Public Health Goal (PHG) of 0.15 ug/L for benzene in drinking water. PHGs are levels of drinking water contaminants at which adverse health effects are not expected to occur from a lifetime of exposure. The California Safe Drinking Water Act of 1996 (Health and Safety Code Section 116365) requires OEHHA to adopt PHGs based exclusively on public health considerations. PHGs adopted by OEHHA will be considered by the California Department of Health Services (DHS) in establishing or revising primary drinking water standards (California Maximum Contaminant Levels, or MCLs). DHS is required by the same law to review their MCLs every five years and to revise them to as close to PHGs as is practicable, considering economic factors and technical feasibility. Technical support documents for PHGs are available on the internet at www.oehha.org/water/phg.

The benzene PHG is based on the risk of getting cancer, in this case leukemia, from exposure to benzene through the municipal and domestic water supplies. Benzene is one of a very few chemicals considered to be *known human carcinogens*. For these chemicals, cancer cases in humans have been documented as being directly related to chemical exposure. This is the strongest type of evidence for the relationship between cause and effect. Other *known human carcinogens* include arsenic, vinyl chloride, and ionizing radiation.

PHGs for carcinogens are set at the concentration in water associated with a *de minimis* level of cancer risk – one extra cancer case per million persons exposed over their lifetimes. For volatile contaminants, such as benzene, the use of drinking water in the home can cause exposure through not only the ingestion of water, but also through dermal contact and the inhalation of vapors resulting from

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showering and other household water uses. Therefore, PHGs for benzene and other volatile chemicals are calculated by considering all of these exposures. For this reason these PHGs are often lower than other cancer risk estimates that consider only ingestion exposure. These additional exposure routes are relevant to the beneficial use of water for municipal and domestic supply (MUN).

PHGs and other toxicological criteria may be used to evaluate compliance with narrative water quality objectives for Toxicity in the Basin Plans, as these objectives relate to beneficial uses involving human exposures (e.g., municipal and domestic supply). Therefore, ambient groundwater or surface water with chemical concentrations above PHGs could be interpreted as violating water quality objectives if the waters are designated MUN.

Action Levels for Trimethylbenzenes

Also in June 2001, DHS published drinking water action levels of 330 ug/L for both 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene, also called pseudocumene and mesitylene, respectively. These chemicals are constituents of petroleum based fuels. They are also used in the manufacture of dyes and pharmaceuticals. 1,3,5-Trimethylbenzene is used as an ultraviolet oxidation stabilizer in plastics.

Action levels are health-based advisory levels for chemicals that do not currently have primary MCLs. An action level may be established by DHS when a chemical is either found in a drinking water source or is in close proximity to a source and guidance is needed should it reach the source. Like PHGs, drinking water action levels may also be used to evaluate compliance with narrative water quality objectives for Toxicity. Additional information on action levels may be found on the internet at www.dhs.ca.gov/ps/ddwem/chemicals/AL/actionlevels.htm.

Reference Doses for Bromate and Hexachlorocyclopentadiene

In early June, the U.S. Environmental Protection Agency (USEPA) added a reference dose for bromate (BrO_3^-) equal to 28 ug/L in drinking water to their Integrated Risk Information System (IRIS) database of chemicals health effects. Reference doses represent exposure limits below which non-cancer health effects are not expected to occur. Reference doses may be translated into concentrations in drinking water using standard assumptions for the amount of water ingested each day, average body weight and potential exposures to the chemicals from other sources. Bromate is also considered to be a probable human carcinogen, with a one-in-a-million incremental cancer risk estimate of 0.05 ug/L, also reported in IRIS.

USEPA also updated their reference dose for hexachlorocyclopentadiene. The new criterion is equal to 42 ug/L in drinking water. Hexachlorocyclopentadiene is used in the manufacture of flame retardant chemicals and pesticides.

IRIS may be found on the internet at www.epa.gov/iris.

Drinking Water Standard for Arsenic

The current drinking water MCL for arsenic of 50 ug/L was developed in the 1940s. It does not reflect current health effects information. USEPA's IRIS toxicologic database contains a reference dose for non-cancer health effects equal to 2.1 ug/L of arsenic in drinking water and a one-in-a-million incremental cancer risk estimate of 0.02 ug/L. OEHHA has published a cancer potency factor equal to 0.023 ug/L at the one-in-a-million risk level, and is expected to publish a draft Public Health Goal for arsenic in the near future. Arsenic is considered to be a "known human carcinogen" (see the discussion

of this term under *Public Health Goal for Benzene*, above). The epidemiologic data on which the cancer risk estimates are based directly link human exposure to arsenic in drinking water with cases of cancer.

In addition to man-made sources (e.g., arsenical pesticides, wood treatment chemicals, metal smelting) arsenic is a naturally occurring element. It is present in many source waters, especially in the western United States, in concentrations that are often equal to or higher than health-protective levels. For some drinking water supply systems, there would be significant costs if they were required to deliver water to customers below the current MCL.

On 22 January 2001, USEPA adopted a new federal MCL for arsenic of 10 ug/L. On 22 May, USEPA revised the new standard by delaying its effective date until 22 February 2002 in order to conduct reviews of the scientific and economic analyses on which the new MCL was based. On 19 July, USEPA proposed a range of MCL options for arsenic – 3 ug/L, 5 ug/L, 10 ug/L, and 20 ug/L – and requested additional comment on the technical basis for the original 22 January rule. Comments are due by 31 October. More information on the federal arsenic MCL may be found on the internet at www.epa.gov/OGWDW/arsenic.html.

Allowable levels of arsenic in surface water and groundwater are governed by water quality objectives and natural background concentrations. For waters with the beneficial use of municipal and domestic supply (MUN), applicable water quality objectives include both the Chemical Constituents objective and the Toxicity objective. The Chemical Constituents objective requires that water not exceed California MCLs. The Toxicity objective prohibits toxic substances in toxic amounts. Where natural background levels exceed water quality objectives, the Regional Water Boards do not have the authority to require that water quality objectives be met. However, in such cases, controllable water quality factors, such as the discharge of waste, are not permitted to cause natural concentrations to increase.

Total vs. Dissolved

Recently, questions have arisen as to how to measure compliance with USEPA national recommended water quality criteria and USEPA promulgated (California Toxics Rule and National Toxics Rule) criteria for aquatic life protection and human health protection. For metallic constituents, the aquatic life criteria specify whether compliance is to be determined based on dissolved or total recoverable measurements. Human health criteria for metallic constituents and both human health and aquatic life criteria for non-metallic constituents do not specify. According to Phil Woods, Water Quality Standards Coordinator for Region 9 of USEPA, compliance with all criteria which do not specify dissolved or total recoverable are intended to be determined using total recoverable measurements. In *Water Quality Goals*, dissolved criteria for metallic constituents are footnoted (1) and total recoverable criteria are footnoted (2). For other constituents, use total recoverable concentrations.

Updating Your Copy of *Water Quality Goals*

Please make the following changes to your copy of *A Compilation of Water Quality Goals*, August 2000 edition, to reflect the new information discussed above:

Inorganics Page 2

Bromate: Add an entry of “28” under USEPA Integrated Risk Information System Reference Dose.

Organics Page 7

Benzene: Change the California Public Health Goal entry to read “0.15” and delete the footnote.

Organics Page 44

Hexachlorocyclopentadiene: Change the USEPA Integrated Risk Information System Reference Dose entry to read “42” and delete the footnote. Change the One-in-a-Million Cancer Risk Estimate – USEPA Integrated Risk Information System entry to read “E” and delete the footnote.

Organics Page 79

1,3,5-Trimethylbenzene: Add an entry of “330” under California State Action Level - Toxicity.

1,2,4-Trmethylbenzene: Add a new listing for this chemical and add an entry of “330” under California State Action Level - Toxicity.

Please contact me by phone at (916) 255-3123 or CalNet 8-494-3123 or by e-mail at marshaj@rb5s.swrcb.ca.gov if you have questions.

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